

Reversible Characteristic of DC Magnetization up to 28T in Single Crystalline $\text{YBa}_2\text{Cu}_3\text{O}_y$

Kazuto Hirata, Hiroyuki Suzuki, Hideki Abe, Haruyoshi Aoki

National Research Institute for Metals, 1-2-1 Sengen, Tsukuba, 305-0047, Japan

Andreas Erb

DPMC, University of Geneva, 24, quai Ernest Ansermet CH-1211 Geneva 4, Switzerland

Abstract

DC magnetization of $\text{YBa}_2\text{Cu}_3\text{O}_y$ single crystals has been measured using a hybrid-magnet in Tsukuba Magnet Laboratory(NRIM) up to 28T at the temperatures between 40K and 80K. Magnetic field is applied parallel to the c -axis of the crystal. Single crystals measured were grown by a self-flux method using a BaZrO_3 crucible at University of Geneva, followed by a high pressure annealing to obtain oxygen content y close to 7.00. In the magnetization curves, reversibility character has been found at the temperatures above 64K on these extremely over-doped samples in the magnetic fields up to 28T without any symptoms of peak effect. Below 61K, the peak effect appears, but with little hysteresis. Although the single crystals have many twins, the irreversibility line is shifted to lower temperatures in the higher magnetic field region, and the peak effect appears at the temperatures about 10K lower than that in the other samples reported as long as we have known. We also found that the appearance of the peak effect is influenced by the doping level(reduction of oxygen from the surface by diffusion at room temperature in these over-doped samples). So, the peak effect may relate to the pinning centers consisted of oxygen defeciencies like oxygen vacancy clusters[preprint A. Erb,*et al.*].